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and that this feature testified more forcibly than anything else to their low affinities. They also described a community of structure between the modified syndemoses in certain Anura and the apparatus of the knee-joint in Mammals, and urged that the facts were such as to necessitate a reconsideration of the morphological value of the latter.

EMBRYOLOGY.¹

NEW STUDIES OF THE HUMAN EMBRYO.—M. C. Phisalix² gives a very complete account of a human embryo of one centimetre (two-fifths of an inch) long. The method of plastic reconstruction from a continuous series of sections is carried out for the entire embryo. The organs which receive special attention and reconstruction are the cranial nerves and nervous system, the disposition of the valves and septa of the cavities of the heart, the origin of the pancreas, and Wolffian bodies. Many points dealt with by His have been more fully elaborated or corrected by Phisalix. The reconstructions seem to have been carried out with great care and accuracy, that representing the relations of the cranial and spinal nerves from the side is very interesting; the same may be said of the reconstructions representing the alimentary canal and its appendages.

The origin of the pancreas from two distinct diverticula will be noted by specialists as a matter of interest. The great length relatively of the bronchi at this stage and the acute flexure of the branchial region are very strikingly shown, while the crowding together of the branchial clefts and the diverticula from them which give rise to the thymus gland are admirably shown in their relation to adjacent parts. But as the memoir is hard to understand without the figures which accompany it, the reader is referred to the original for fuller anatomical details.

A curious fact is mentioned by the author in regard to the embryo described by him, viz., its want of perfect symmetry, though believed to be perfectly normal. The left side, especially the region of the cerebral vesicles, was found to be larger

¹This Department is edited by JOHN A. RYDER, University of Pennsylvania, Philadelphia.

²*Etude d'un Embryo humain de 10 millimetres.* Arch. de Zool. Expr. 2 me Ser. vi. 1888. Nos. 2 et 3. pp. 280-350, planches xiii-xviii and figs. A.-F. in text.

than the right. The author asks, is this embryonic asymmetry peculiar to man? And also, does it bear any relation to the functional predominance of the right side over the left in the adult. This memoir is a valuable one, as it supplies a thorough study of one very important stage of the human embryo, and is a very creditable continuation of the work of His and Fol in the same direction.

ON THE DEVELOPMENT AND FIRST TRACES OF THE ANTERIOR ROOTS OF THE SPINAL NERVES IN SELACHIANS.¹—This last of Prof. Dohrn's studies forms chapter xiv. of the *Studien zur Urgeschichte des Wirbelthierkörpers*; it is most suggestive as is all of his work. The problem of the origin of the anterior or motor roots of the spinal nerves has given rise to a great deal of speculation and discussion. It has been the good fortune of Dohrn to find in embryos of *Mustelus* and *Pristiurus* 3 mill. 5.5 mill. and 10 mill. long, conditions of the development of the anterior or motor roots which are of great importance.

1. The motor roots grow out at the lower angles of the medullary tube before the appearance of the white matter of the cord as conical or more or less produced extensions of the plasma of that tube. At first these roots contain absolutely no nuclei, but are simply homogeneous pseudopod-like processes.

2. Mesodermal cells next approach and sink into these plasmic processes. These probably have something to do with the development of the primitive sheaths of the future nerve fibres.

3. These plasmatic ventral processes from the medullary tube now blend over the extent of their outer surfaces with the still undifferentiated plasma of the adjacent cells of the proto-vertebræ or somites. Junction of the motor portion of the nervous mechanism with the tissue still to be converted into muscle is thus found to have taken place before even the formation of true nerve fibres or of muscular fibrillæ.

4. The next step in the differentiation of the motor roots is the migration of medullary cells into the above mentioned plasmatic processes from within the walls of the medullary tube. This seems to be conclusively established by the fact that the nuclei of medullary cells were seen in process of division at or within the bases of these processes.

It seems to be thus conclusively established that of the prim-

¹Ueber die erste Anlage und Entwicklung der motorischen Rückenmarks nerven bei den Selachiern. Mitth. aus d Zool. Stat. zu Neapel. viii. 1888. pp. 441—461. Taf. 22.

itive constitution of motor nerves, neither fibres nor sheaths form a part. Neither are axis cylinders or medullary substance developed. End-organs or terminal branching ramifications of the nerve fibres do not as yet exist, but the capacity for their development is probably inherent in the simple structures and relations above described. The relations described by Dohrn are strongly opposed to the theory of the *ab initio* continuity of nerve and muscle by impalpably fine fibres, and if fully established fatal to Hensen's doctrine. It is needless to add that, while these new results are not wholly in accord with those of Balfour, they will probably serve to complete the true doctrine of the development of the spinal and cranial nerves, the foundations of which were first laid down by that remarkable investigator.

THE MATURATION AND FERTILIZATION OF THE EGG OF PETROMYZON PLANERI.¹ A. A. Böhm in this extended memoir gives a very complete resumé of the work of his predecessors upon the early history of the eggs of the lamprey. The formation of the polar globules is described, and the peculiar manner of union of the segments of the female and male pronuclei are illustrated. It seems that the chromatin substance of the head of the spermatozoon in this process always first breaks up into about four rounded segments or *spermatomerites* as Böhm calls them, which remain for some time lying close together in a straight or curved row.

PHYSIOLOGY.²

INHIBITION IN MAMMALIAN HEART.—Professor McWilliam continues³ his work on cardiac physiology by a study of the phenomena of inhibition in the mammalian heart.⁴ The results are given in considerable detail, and can be discussed here very briefly only. The effects of the stimulation of the vagus nerve on the auricles and on the ventricles are in general similar, consisting

¹*Ueber Reifung und Befruchtung des Eies von Petromyzon planeri*, Arch. f. mik. Anat., xxxii. 4 Hft. 1888. pp. 613—670. Taf. xxiv—xxv.

²This department is edited by Dr. Frederic S. Lee, Bryn Mawr College, Bryn Mawr, Pa.

³See AMERICAN NATURALIST, Jan. 1889.

⁴*Journal of Physiology*, vol. 9., p. 345.